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ABSTRACT

In an attempt to study strategies that college students use to attain high marks in a difficult course, a community college study skills instructor enrolled in a regional geography course and monitored the strategies he used to study for the course. The goals of the study were to determine how knowledge of the criteria was gained, how attention was focused on the textbook, and what kinds of encoding activities were used. Findings showed that the instructor employed traditional techniques to help remember the material, such as memorization, repetition, and rehearsal. The conclusion was that each studying context presents a set of clues that can enable the student to acquire knowledge about the criterion events, focus attention on relevant text information, and engage in encoding activities. (Fifteen references are appended.) (MS)

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Studying Hard For A College Level
Geography Course:

A Case Study

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Studying hard for a college level geography course: A case study

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Which studying strategies does a college student use to attain high marks in a difficult course? A community college study skills instructor investigated this question by enrolling in a regional geography course and monitoring the strategies he used to study for the course.

Prolog

The investigation was prompted by a concern (Anderson & Armbruster, 1982; Casale & White, 1980) about the suspected lack of generality or "workability" of some common studying strategies, e.g., the SQ3R family of reading strategies (Robinson, 1945; Pauk, 1984) and the Cornell Method for notetaking (Pauk, 1984). Also of concern was the fact that most studying strategies are taught as if they were content free in practice. If this is true, the structure of the to be learned network of ideas, the procedural knowledge in a content area, as well as the ways an instructor lectures and constructs test, would play only a minor role, if any, in the student's selection and application of studying strategies.

With these concerns in mind, we decided that the study skills instructor would enroll as a serious student in a college level regional geography course. The arrangements to take the course were simple and informal. The instructor asked permission from his colleague to attend the class with the intent to develop a studying strategy specifically modified to meet the needs of students in that course. The geography instructor, who often referred students in need of special assistance to the study skills instructor for help, agreed to the plan and welcomed this interest in his course. In addition, the study skills instructor hoped that he would be able to attract students who were having trouble with the course and tutor them from an "informed" advantage. That is, he would be able to teach them effective studying strategies from the vantage point of having gained a good grounding in the content area.

Initially, we thought that our biggest contribution to the typical, struggling students' dilemma would be to help improve their ability to read their textbook. We had several ideas, based on what we knew about the structure of the content area, and the usefulness of these structures (e.g., knowledge structures and text structures) when reading expository text.

The plan did not develop as we had anticipated. We will describe what happened, and attempt to explain it in a framework garnered from certain cognitive psychology notions.

Setting

The subjects in this investigation were three college level instructors and four course sections (approximately 100 undergraduate students) of regional geography. They ranged in age from 18 to over 60, and had enrolled in the

course as part of their regular college curriculum. The first author is a reading/study skills instructor at the community college where the investigation took place. The second author is an educational psychologist and senior scientist at the Center for the Study of Reading at the University of Illinois. The first author was taking an independent course of graduate study with the second author while the study unfolded. The third instructor taught the regional geography course at the community college.

The instructional materials and activities were typical of a college level introductory course. They included a comprehensive textbook, a study guide, lectures and tests. The course syllabus assigned the first four chapters (a total of 242 pages) of the textbook throughout the semester. The Dale-Chall (1948) readability index estimated the textbook to be at about the 13.5 grade level.

The students were given a study guide to accompany each of the six unit tests. The study guide was an instructor-modified version of the guide provided by the publisher and discussed in the teacher's manual. As part of the study guide, the instructor gave the students a grid or "frame" (Armbruster & Anderson, 1984) that represented the kinds of topics that are discussed when studying the geography of regions.

The students took six unit tests which covered general geographic concepts (in the introduction), and the regions of Europe, Australia, the Soviet Union, North America and Japan. The first five unit tests had 50 multiple-choice, true-false and fill-in-the-blank questions. The sixth was a combination of 30 such items and a blank map of Asia, on which the students filled in the names of each of the countries.

The class sessions consisted of three weekly lectures of 50 minutes each for 16 weeks, followed by a final exam. The instructor used these lecture periods to introduce and elaborate on new concepts, with the help of maps, charts and a globe. The instructor was aware of the fact that the text was too difficult for many of the students, so he used this period to explain the more difficult concepts, as well as to cover most of the material that would be on the tests. He also helped the students answer any study guide questions not answered in the textbook, but left most questions for which the text provided information for the students to answer themselves. After each test, a copy was made available for analysis purposes.

During the semester, we met weekly to discuss the strategies employed during the week, any ideas or observations noted in the weekly log, and recent (or upcoming) tests.

Results

What happened in this course? A detailed account of the strategies employed by the study skills instructor is given for each test.

Unit Test I: Geography Concepts

Initially, the study skills instructor followed the course syllabus and read the assigned text pages for unit one. This unit included information on broad geographic concepts such as location of a place on a map or globe, the division between the physical landscape and the cultural landscape, and the interaction among such elements within those landscapes such as climate, soils, vegetation, hydrology, economics, culture, politics, race, language and religion. Geography encompasses a wide domain of ideas, and it attempts to integrate these widely separated human concerns into one discipline. The domain of geography can be divided as follows:

I. Cultural landscape, including:

- A. race
- B. language
- C. religion or value system
- D. economy
- E. political structure
 - 1. internal security
 - 2. external security

II. Physical landscape, including:

- A. landforms
 - 1. mountains
 - 2. hills
 - 3. plains
 - 4. plateaus
- B. hydrology
 - 1. rivers
 - 2. lakes
 - 3. groundwater
 - 4. rainfall
- C. climate
- D. vegetation
- E. soils
- F. mineral resources

Each of these topics was discussed in great detail. It was not light reading by any means, with readability samples ranging from 12th to 16th grade on the Dale-Chall scale. While reading the Introductory Chapter, the skills instructor encountered problems in applying the SQ3R method he had been teaching in his study skills course. The procedure for using the SQ3R version (Robinson, 1970; after Pauk, 1985) is described as follows:

1. **Survey the text**, reading summaries at beginning and end, glancing at headings, pictures, captions and other graphics to get a flavor for the content and to build advance organizers (Ausubel, 19).
2. **Ask questions** by turning headings into questions or by generating general questions of one's own.
3. **Read** the text to answer the question.
4. **Recite** the answers by covering the text, exposing only the headings, saying aloud all that is remembered, and finally, checking oneself afterwards for accuracy.
5. **Review** immediately after reading and periodically thereafter.

To begin with, the survey step of SQ3R had limited value when reading this chapter. For example, the title of the chapter, "Introduction:Regional Geography of the World," gave little helpful information to a novice who didn't already have a good background in regional geography. Although there are many pictures and maps in the chapter, surveying them would tend, at first glance, to leave a reader more muddled than before opening the book. The pictures, maps and charts provided no advance organizers; they were simply illustrations for the text, with no obvious meaning independent of it.

The headings included "Concepts of Regions," "Concepts of Culture," "Vegetation Patterns," "Water, Essence of Life." The latter heading was followed by five pages (about 600 words, per page of text, maps and pictures). One could survey such headings and be able to conclude only that the chapter was about geography, and that geography had something to do with culture, vegetation and water.

What about the second step of SQ3R, the question step? What kind of questions might one ask from such headings? "What are vegetation patterns? Why is water the essence of life?" While these are respectable questions, that fail to penetrate very deeply the content information. Forming these questions is limited severely by the students' background knowledge. How about "How do rainfall patterns affect vegetation patterns and vice versa?", a question which in effect is answered throughout these sections? Freshman community college students are not analytical enough to ask such a question at this stage of their study. Yet this is the question that they would supposedly be answering as they completed the third step of his SQ3R, the "read" step.

The read step of SQ3R asks a reader to actively search for answers to whatever questions he has posed either from the headings or, in the absence of headings, from his own understanding of what he was about to read, based on the interaction between background knowledge and what was just read.

The recite step is not practical for this textbook, for the same reason that makes the question step impractical. There is too much text between headings, and too little information in the headings. For example, the headings, "Food Production" and "Japan in the Post-Industrial Era" were each followed by about 1100 words of text.

The review step is always practical, provided the student was able to read the text with meaning in the first place. Who could deny that review of some form or other is necessary for optimal test performance. Robinson (1970) does not specify the direction of that review and we suspect that the kind of review one undertakes would make a difference. We return to this issue in our discussion section.

A strategy that quickly replaced the SQ3R strategy was one in which information from the study guide helped in the "Q3R" steps. Here, the student questions the text with study guide questions, reads to answer the questions, recites the answer by covering up the question, and reviews the study guide periodically. The course instructor had foreseen the difficulty his students would have with the text, and even included the page numbers on which specific answers could be located. This facilitated the use of the study guide.

Another strategy typically recommended to students is to "read the chapter before the lecture." Was this a realistic or useful "axiom?" In fact, even the study skills instructor with perhaps 20 years of formal education and a demonstrated ability to read textbooks, put discretion before valor and modified this axiom to "preview the chapter before the lecture, but keep it open during lectures." This, along with another new axiom of "keep the study guide handy during lectures and while reading the text," turned out to be quite useful.

What happened during lectures? The course instructor's lectures ranged from topics related to the world vegetation map to the soil map to the precipitation map to the climate map and back, painting with a broad brush from the arctic to the tropics. Often, one would discover, at the end of an anecdote or brush stroke, the answer to one of the study guide questions — even one not available in the textbook chapter.

Did the researcher use the Cornell notetaking format (Pauk, 1984) he taught in his study skills class? Although he eventually followed Pauk's suggested step of reading over lecture notes directly after class while they were still fresh in mind, and could still be expanded, he did not use this notetaking convention in toto. He used a more complicated strategy, instead. He divided his attention among these processes: listening to the instructor, summarizing important points in writing, glancing through the chapter and looking at the charts handed out by the instructor.

This division into several processes seemed to be important because there were times when the instructor would refer to tables or maps in the book or on handouts. During these discussions, the study skills instructor decided it was important to have these charts and maps in front of him. These pictures, charts, graphs and maps served to illustrate the "text" of the lecture. He also kept his study guide handy and open to the topics currently under discussion in the class. He frequently made notes in his study guide when it seemed better to write them there than with the summaries he periodically wrote in his lecture notebook.

This strategy was modified later in the course to reflect the pattern of what information from lecture, chapter and study guide was important and was likely to appear on the test. In summary, the study skills instructor developed his own systems to study for the test. It included these steps:

1) Preview or lightly skim the text relative to concepts about to be discussed in the lecture.

2) Attend lectures for explanation of and elaboration on key concepts and to build background by listening in preparation for actually reading the chapter.

3) Use the question of the study guide to focus one's attention within the textbook, reading to find answers to questions as in the "question" and "read" steps of SQ3R.

4) Write out the answers on a separate sheet of paper, using lecture notes, the chapter, and handouts as resources for finding these answers.

5) "Recite" and "review" by asking the original questions of the study guide and trying to write the answers from memory. Check these answers against those developed in step four. Repeat this step until all the questions are mastered.

An analysis of the first test showed that the study guide, although very useful as an aid to reading the chapter, was helpful on only 32 out of 50 questions, a mere 64% of the test. Another 24% of the test questions was covered in lecture and in the chapter, and the remaining 12% could be answered only from information presented in the lecture. The researcher scored 92% on this first unit test, missing several questions about map concepts covered in the lectures. The researcher resolved to take more thorough notes in class, and added another step to his studying procedures, e.g., expanding lecture notes as soon as possible after the lecture, while the ideas were still fresh in his mind.

Unit Test II: Western Europe

This was the next of five units on regions of the developed world. Using the model (grid) for regional geography proposed by the instructor, the researcher drew up the following grid to summarize, sort and categorize the facts about Western Europe into a meaningful framework:

1. Name of country:
2. GNP:
3. Per capita income:
4. Strengths of the country:
5. Weaknesses of the country:

A.	B.	C.	D.	E.	F.	G.	H.
country	climate	resources	agricul.	indus.	relig.	lang.	cities

As many facts as possible were written into the appropriate categories for each country, which were themselves grouped into their appropriate regions (Nordic, Mediterranean, Low Countries, etc.). The researcher answered the questions on the study guide before filling out the grid. He then went through the chapter on Europe to glean out information which seemed important (test-type materials). This was written in the form of summaries and raw notes, such as a list of important cities, their products and their importance to the rest of the country. Then, as much as possible of this information was squeezed onto the grid. He felt that the process of constructing the grid was an important step in learning the information, because it required a structuring of the ideas. Also doing it helped decide which among many possibilities were the most important.

To study the grid in preparation for the test, the researcher masked the information below the headings, and tried to recite a few lines at a time. He checked his performance by uncovering the few lines just recited to see if he was correct.

He then constructed a proactive test of 50 questions, based primarily on information from the study guide. Also, he wrote the answers to these questions on a separate sheet. His rationale for this was that the questions could help him to memorize the material by asking and answering them until he mastered them. He patterned his questions after those in the study guide, and based the content of the questions on what the model for studying geography would predict to be important. Again, just writing the questions seemed to be useful in learning the material, and answering them was a good final review.

The researcher scored 96% on this test. Only eight of 50 test questions came from the study guide. Information of the grid and practice test were in 32 of 50 items, or 64%. Information on eight of the questions not predicted were on rivers and was not in the above sources. The researcher failed to include rivers, an essential element of the physical landscape, on his grid. Of the remaining questions not found in the above sources, four were covered only in lectures and six were covered only by the text. The next adjacent test, whatever its form, would have to include rivers and landforms.

Unit Tests III to VI

For test III, Eastern Europe and Australia, the researcher adapted his study method to the information presented in the unit and, rather than using his grid, he gleaned test worthy information from the text, and made up a practice test. He scored 98% on this test.

For test IV, the Soviet Union, the researcher answered the study guide questions and then drew a rough regional map of the Soviet Union and summarized information by region into a table. He scored 90% on this test and suspected that had he prepared more extensive adjunct texts and tests, he may have increased his performance on this test.

For test V, North America, the researcher again drew a table with information organized by principal region, and then went back to the text to add to his table any information he thought might be test worthy. He scored 94% on this test.

For test VI, Japan and the Asia map, the researcher summarized information in a table according to the core regions. He studied it by asking study guide questions and additional questions of his own, and answering them until he knew them by heart. He studied the Asia map by writing the

names of Asian countries onto a blank map until he knew them all. He scored 98% on this test. His average on the five tests was 95.6%, second highest in the class.

Discussion

We now introduce a theoretical framework to help explain our observations of this studying scenario. We conceptualize the process of studying as having two major components: state variables and processing variables.

The **state variables** are those related to the status of the student and the to be studied text at the time of studying. Important student state variables include knowledge of the learning criteria, prior knowledge of the content area and motivation. Important text state variables include content covered, organization or structures, and other features that affect the "readability" of the prose. The **processing variables** are those involved in getting the information from the written page into the student's head. Processing variables include the initial focusing of attention, the subsequent encoding of the information attended to, and the retrieval of the information as required by the criterion task. Studying is a function of the interaction of state and processing variables. A discussion of some of these components and a review of related research follows.

Although state variables include several student and text-associated variables, "knowledge of the criterion event" is the one that is rather uniquely related to studying. Results from several lines of research (reviewed and reported by Anderson and Armbruster, 1982) generally support the hypothesis that the more specific the knowledge about the criterion event, the greater the effectiveness of studying. In those conditions where the criterion task is known exactly, performance is much higher than that found in a control condition. The effectiveness of studying decreases as knowledge of the criterion task decreases. Finally, when the nature of the criterion task is only vaguely known, facilitative effects are difficult to demonstrate.

Knowledge of the criterion task may be a necessary condition for optimal studying, but it is obviously not a sufficient condition. Knowledge of the criterion task must be accompanied by processing of the relevant information. Because there are so many ideas that students encounter while studying, it is folly to think that they all could, or even should, be learned and remembered. Therefore, the prime tasks of students are to focus attention and engage in encoding activities in a way that will increase the probability of undertaking and retrieving the "high pay-off" ideas and relationships. In other words, the students must select the segments of text and lectures that contain the most important ideas and ensure that they are well understood and likely to be remembered.

Which cognitive processes actually occur when students focus attention and concentrate hard are mostly conjecture at this point. Two theoretical frameworks, however, suggest in a very general way some processing variables relevant to studying. These are the "principle of encoding specificity" (Tulving & Thomson, 1973) and "the principle of levels of processing" (Anderson, 1970, 1972; Craik & Lockhart, 1972).

According to the principle of encoding specificity, the way in which information is encoded determines how it is stored. This in turn determines which retrieval cues will effectively access it. This principle calls attention to the important interaction between initial encoding and subsequent retrieval operations: The optimal form of processing is ultimately dependent on the nature of the retrieval task. The implication of the encoding specificity notion for studying is that studying will be facilitated to the extent that students

know the performance requirements of the criterion task and encode the information in an optimal form to meet those requirements. If students know the exact questions to be asked, then naturally they should "perform" the answers to those questions. If students do not know the exact questions, but know the general type of questions, they should focus their studying on the class of appropriate responses to tasks of that type.

Processing the information in a form as close as possible to the requirements of the criterion task is only part of the problem. The students must also be concerned with the qualitative nature of the processing they must ensure that the requisite information is processed in such a way that it is stored and available when needed to perform the criterion task. A theoretical framework pertaining to the qualitative aspects of the processing effort is the "principle of levels of processing" (Anderson, 1970, 1972; Craik & Lockhart, 1972).

According to this principle, stimuli are analyzed in an hierarchy of processing stages, from an analysis of physical or sensory features to an extraction of meaning. The durability of memory traces is a function of depth of processing, where greater depth implies a greater degree of semantic analysis. In other words, what is stored in memory is determined by the kinds of operations performed on the input. The implication of the levels of processing notion for studying is that performance on criterion tasks requiring comprehension recall will be facilitative to the extent that students attend to, interact with, and elaborate on the underlying meaning of the text.

Together, then, the principles of encoding specificity and levels of processing suggest that studying will be effective if students process the right information in the right way, where right information is defined with respect to the criterion task and right way connotes a relatively deep or meaningful level of involvement with the text.

Students can and do engage in a variety of covert and overt activities to help them process the right information in the right way. Most of the common studying techniques, such as underlining, note taking, summarizing, and outlining are commonly used because teachers and students alike intuitively believe that these methods of studying will aid in learning and remembering the required information. Unfortunately, empirical research fails to confirm the purported benefits of the popular strategies.

Anderson and Armbruster (1982) reviewed the research on the common studying techniques and concluded that any of them can be effective if its use is accompanied by focused attention and encoding in a form and manner appropriate to the criterion task. Some techniques have more potential than others, however, for promoting the deeper processing suited to criterion tasks requiring greater comprehension and/or recall. These techniques include outlining (Barton, 1930), networking (Holley & Dansereau, 1984), mapping (Armbruster & Anderson, 1982), and schematizing (Camstra & van Bruggen, 1984). These techniques force students to identify, or impose, relationships that convey the meaning of ideas. Not surprisingly, the techniques that are likely to yield the highest learning benefits also have the greatest costs in student time and energy.

To illustrate how this framework of studying can be useful in understanding the strategies used in this case study, we have divided our discussion into three parts: How was knowledge of the criteria gained? How was attention focused on the textbook, and what kinds of encoding activities were used?

How did he gain knowledge of the criteria? His drive, almost compulsion if you will, to learn information about the criteria was a major component of his studying activities. The two major sources of this information were the study guide and the lectures. As noted earlier, the questions on the study guide were always taken seriously and were viewed to be potential items on the tests. Answers to them were carefully constructed and learned in preparation for the tests. Also, the main ideas from the lectures were used as keys to important information. In addition, a third source of information was the geography grid. Main headings in that grid suggested categories of information that were likely to occur for each geographical region. Note that the textbook was not much help in this task. The headings were too general, or they required too much prior knowledge to understand what they meant.

How did he focus attention to relevant areas in the textbook? Remember that there were about 40 pages of reading for each unit test. This typical segment of reading assignment presented about 8,000 idea units of information (based on 600 words per page and three words per idea unit). In addition to the individual idea units, there were pictures, charts and other graphics. The number of potential "meanings" among the interactions of these components was astronomical. Reading to learn it all was impossible.

Instead, he read for specific purposes. These included: finding answers to the study guide questions, locating information to construct grids and tables, and searching for information that would help him elaborate certain important ideas. In a sense, the textbook was seen as an encyclopedia of information rather than a discourse with a structure and organization that was unique to the discipline of geography.

What kind of encoding activities did he use? He engaged in a variety of encoding activities. Taking notes during lectures and writing answers to the study guide were two of the more "straightforward" activities—ones that every student is admonished to do. Recall, that he is often engaged in these two activities simultaneously while attending to the lecture. He often used the study guide as a note taking device.

Being aware that the benefits of simply taking notes during a lecture (compared with listening only) are not very robust (Anderson & Armbruster, in press), he always engaged in another layer of encoding activities in which information from his notes were used. This information was used to construct grids and tables, speculate on the items that would appear on the next test, and write "adjunct" texts and tests. Each of these study aids (grids, tables, texts and adjunct tests) was simply a stylized version of the important information. The grids and tables used spacial clues (rows, columns and cells) to help show the organization of the information while the adjunct text used the conventions of written language (list notations, paragraphs and discourse markers) to help do this.

The techniques of preparing a speculation test encouraged him to think about the ways in which text item formats might be used to organize and highlight information. He considered the type of information that might naturally be included in matching items versus that which might be included in short answer, fill-in-the-blank types of items. Also, he was able to predict some of the "foils," reasonable wrong alternatives, that would be included in multiple choice items. This activity seemed very consistent with the kind suggested by the encoding specificity hypothesis discussed earlier.

Another class of encoding activities concentrated on committing information from the study aids into the student's memory so that it could be quickly and accurately retrieved. These included memorizing, reciting and practicing. While the processes involved in constructing the aids were thought to be

beneficial learning activities, the job didn't appear to be complete until they could be **reconstructed** from memory.

Our "hard studying" instructor employed rather traditional techniques to help remember the material. Basically, he memorized the material by repeatedly reading and rehearsing it to himself. Then, a mask was placed over some or all of it and he tried to say it aloud. Finally, as a test of his memory he would practice reproducing it by writing it down. The general objective was to be able to reproduce the study aid materials, if necessary, during the exam so that he could refer to that information.

This process of learning the content in preparation for an exam was not unlike a problem solving task. The problem was to do well on the test and the solution path was the result of a "means-end" approach (Gagne', 1985). That is, he struggled to approximate the criterion task using all the clues that were available and then tested himself against those criteria. By using an iteration process, he varied his processing strategies as the criteria were better understood after each test.

The typical studying strategies that are taught students are more "forward" in their conceptualizations than those employed here. That is, the general strategies used by **experts** in a process or content area (Gagne', 1985) are referred to as "working forward" strategies. Those such as SQ3R are often taught to give the impression that if you use them, you will be studying like an "expert" and will consequently do well on the test. Anderson and Armbruster (1982) reviewed research findings and concluded that SQ3R has only a mixed history of success as an "expert" technique. Using it does not guarantee that the student will be successful.

Casale and White (1980) and Manzo and Casale (1980) recognized that students often do not adapt expert strategies to the specific requirements of a course and have developed a Problem-solving Approach to Study Skill (PASS) techniques as an alternative. This technique purports to teach students how to address realistically the variety of problems that contribute to their studying failures.

Perhaps, there are no "expert" techniques. Each studying context presents a set of clues that can enable the student to acquire knowledge about the criterion events, focus attention on relevant text information and engage in encoding activities. It becomes a problem solving task to decide which among the many possibilities constitute the path of maximum payoff with minimum effort — an unapologetic objective of all busy students.

Recommendations

We don't see the need to abandon the teaching of how to study courses which include major segments of "expert" systems. In fact, we are rather convinced that the "expert" systems are probably as good or better than what is being employed by most students considered to be "at risk," or are highly likely to flunk the course.

We think, however, that more effort should be spent in making students active problem solvers within the serious game of doing well in a course. This effort might include these suggestions:

1. Teach them that it is all right to use all legitimate sources to find out what might be on the next test. These include: asking the professor, searching for last semester's tests, asking other students and asking other instructors.

2. Teach them how to use all available study aids (textbooks, lecture notes, study guides, etc.) that are likely to be used in a course, but help them

determine early in a course which one(s) is (are) the most effective. Then encourage them to concentrate on it (them).

3. Convince them that finding a good studying partner or two can be helpful in several respects. (In general, problem solving is more effective with several solvers than with just one.) First, different ways of organizing the information may emerge, second, more heads and hands are available to construct the grids, tables and test items, third, more help is available to help untangle confusing information and fourth, someone else can help determine whether the information has been memorized or not.

4. Teach them to learn to study within an authentic course context. Content-free studying techniques make about as much sense as learning to read without using text, learning to play the piano without a piano or learning to tie one's shoes without shoestrings. How-to-study sections of typically tough courses should be offered to students-at-risk. These adjunct sessions should focus on the important **processes** of learning the course information as well as on the content itself. How-to-study instructors could teach these adjunct sessions after they begin feeling comfortable with (not an expert in) the course content.

5. Provide close tutorial support with "at risk" students while they attempt to encode important information in preparation for a test. Many of them may have never successfully memorized much information in their lives and they need to get the feel of what it's like to learn something new the "hard" way.

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